

# A Level Computer Science

## Exam Style Questions

### ***Unit 1.4.2***

#### ***Data Structures***

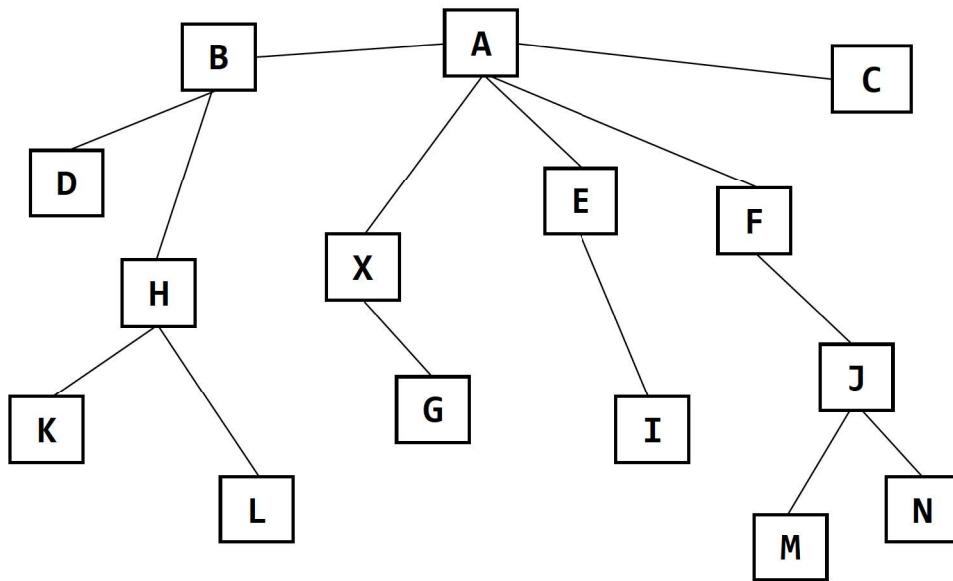
##### *Graphs*

Name		Date	
------	--	------	--

Score	Percentage	Grade
/ 20		

## Question 1

A data structure is shown below in the diagram below.



a) Identify the data structure shown above

1. **What is the primary purpose of the study?**

[1]

b) The programmer is considering using a depth-first (post-order) traversal, or a breadth-first traversal to find the path between node A and node X.

Explain the difference between a depth-first (post-order) and breadth-first traversals.

1. **What is the primary purpose of the study?** (10 points)

2. **What are the key variables being studied, and how are they measured?** (10 points)

3. **What statistical methods are used to analyze the data, and what are the results?** (10 points)

4. **What are the conclusions drawn from the study, and what are the implications?** (10 points)

[4]

c) Show how a depth-first (post-order) traversal would find the path between node A and node X for the structure shown in the diagram above.

[6]

d) Explain how you used backtracking in your answer to part c).

[3]

## Question 2

a) Describe what is meant by a graph structure.

[2]

b) The pseudocode below shows part of an algorithm which uses a queue to traverse a graph breadth-first. Complete the missing elements of the algorithm.

```
markAllVertices (notVisited)

start = 
markAsVisited(  )

pushIntoQueue(start)

while QueueIsEmpty() == 
    currentNode = removeFromQueue()

    while allNodesVisited == false
        markAsVisited(  )

        // following sub-routine pushes all nodes connected to
        // currentNode AND that are unvisited

        pushUnvisitedAdjacents()

    endwhile

endwhile
```

[4]